US Army Corps
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Buffalo District

Ashtabula River Partnership
Environmental Dredging Project

Dredging Limits Confirmatory Sediment Sampling Report

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TABLE OF CONTENTS

1.0 INTRODUCTION

The recommended dredging scenario for the Ashtabula River is the deep dredging scenario, which is based on removing all sediments with a PCB concentration greater than 10 ppm. This includes the removal of material from outside the Federal navigation channel. Soundings of the river from areas dredged in 1945 for the cleanup area beginning upstream of the Fifth Street Bridge to the upper end of the Federal navigation channel have recently been obtained. Based on the assumption that areas outside these sounding have not been dredged since that time, it is expected that these areas have not been contaminated by PCBs. It was discovered that sediments outside of the 1945 soundings were targeted for removal by the current dredging scenario in several areas of the river. If those sediments were not contaminated, a potential cost savings to the project could be realized by leaving that material in place.

A sampling and analysis program was developed to determine the extent of PCB contamination in the sediments outside the 1945 soundings but within the cut lines of the current dredging scenario. This program included collection of sediment cores from the areas of interest, screening tests of core sections for PCBs, and definitive analysis of selected core sections for PCBs. The results from the laboratory analyses were used to determine if there were areas where sediments could be left in place based on PCB concentration, and the volume of sediments that would be affected.

2.0 BACKGROUND

The baseline for this project was the bank-bank-bedrock dredging scenario, which would have resulted in the removal of all sediments contained between the banks of the river down the underlying bedrock. This dredging scenario raised several concerns including: project costs and engineering difficulties. Due to these concerns, there was a need to consider other alternatives. That process began by looking at the Woodward-Clyde study that was performed on the river in the late 1980's from which data gaps were identified. Following a data gap analysis in 1994, a plan for additional sediment sampling was prepared that would better determine what areas of the river were contaminated. The additional sediment samples were collected in 1995 and analyzed for PCBs. Due to the abundance and distribution of PCBs in the river sediment, it was agreed that it would be used as an indicator to determine sediment contamination. In addition, several samples were analyzed for RCRA contaminants to determine if the sediments would be classified as a hazardous waste. The results of those tests were negative, so the subsequent project studies focused only on PCBs.

During the 1995 sampling, surveys of the river bottom were performed and converted into a 3-dimensional mesh. The data gained from the sediment analysis was interpolated onto the mesh to produce a 3-dimensional depiction of sediment contamination. It was determined during the development of the 3-dimensional model that achieving a sediment surface concentration of less than 10 ppm PCBs would not result in a dredging plan that was sufficiently different from the bank-bank-bedrock scenario.

There were ultimately three dredging scenarios that were considered: bank-bank-bedrock, deep dredging, and shallow dredging. The three scenarios were evaluated based on five criteria: 1) sediment volume removed, 2) PCB mass removed, 3) post-dredging surface area weighted PCB concentration, 4) volume of TSCA sediment removed, and 5) cost. The deep dredging scenario was determined to most effectively satisfy the five criteria. The 10-ppm PCB surface concentration used as the basis for the deep dredging scenario was not considered to be "protective". However, it was determined that over time, redeposition of cleaner sediment would cover the material left behind, and result in a clean channel bottom.

Approximately 3,500 feet of bulkheads and side slopes along both sides of the river would be affected by the recommended dredging plan. These bulkheads are constructed of various materials, i.e.,

approximately 50% are sheet pile, some are pre-cast concrete panels, and some are made of timber. Most were constructed many years ago and there is no information about their design or construction. It is likely that for those bulkheads constructed with sheet pile, the sheet piles do not penetrate the bedrock. Any extra sediment left in-place would help to improve post-dredging bulkhead stability. However, there is still a risk to the integrity of the bulkheads even if all the material identified in this report were left in place.

The areas targeted for further investigation were not based on the mass of material needed to ensure stability of the bulkheads, but rather, were identified by comparisons of the "dredging cuts" of the recommended plan to surveys performed after dredging in 1945. The 1945 dredging was the most extensive in the available historical record. Based on the assumption that the contamination in the river occurred after 1945, there is reason to believe that material from areas which were not dredged in 1945, would have no, or low levels of PCB contamination. The current sediment samples are from areas where the cuts of the recommended dredging plan intrude into areas not dredged in 1945.

The basic assumptions employed throughout this analysis are as follows

1. The dredging performed in 1945 is the most extensive performed to date.
2. Contamination of the sediments from PCBs occurred after 1945.
3. Sediments outside the 1945 dredging limits have remained stationary (i.e., re-suspended, eroded, or transported downstream).
4. In order to proceed with any dredging modifications proposed in this report, an amendment to the deep dredging scenario specified in the Ashtabula River Comprehensive Management Plan (CMP) would be required.

3.0 METHODOLOGY

3.1 Sample Locations

A total of 19 sample locations were selected for this study using the following methodology:

- Data sampling points (cores) from the 1990 Woodward-Clyde and 1995 Corps of Engineers PCB sampling efforts (Appendix A) were projected to their nearest cross section for the 1945 sampling data.
- The projected core data were analyzed in context of the 1945 soundings. In some cases, the data were sufficient to reach a conclusion, there were data gaps that needed filling in, or there were possible conflicting data. Cross-sectional areas that were checked were those where large areas (sediment volumes) existed between the 1945 cross-sections and the cleanup cross-sections.
- Sampling points were added using the following criteria:
    - there were data gaps that needed to be filled (BH-7, BH-8, BH-9, BH-10, BH-11, BH-12, BH-14, BH-16, BH-18), and/or
    - additional data verification was needed due to conflicting data (BH-2, BH-4, BH-6, BH-7, BH-13, BH-19), and/or
    - there was a possible transition in the data (BH-4, BH-6, BH-7, BH-12, BH-13, BH-14, BH-16, BH-19), and/or
    - for data confirmation (BH-1, BH-3, BH-5, BH-15, BH-17).

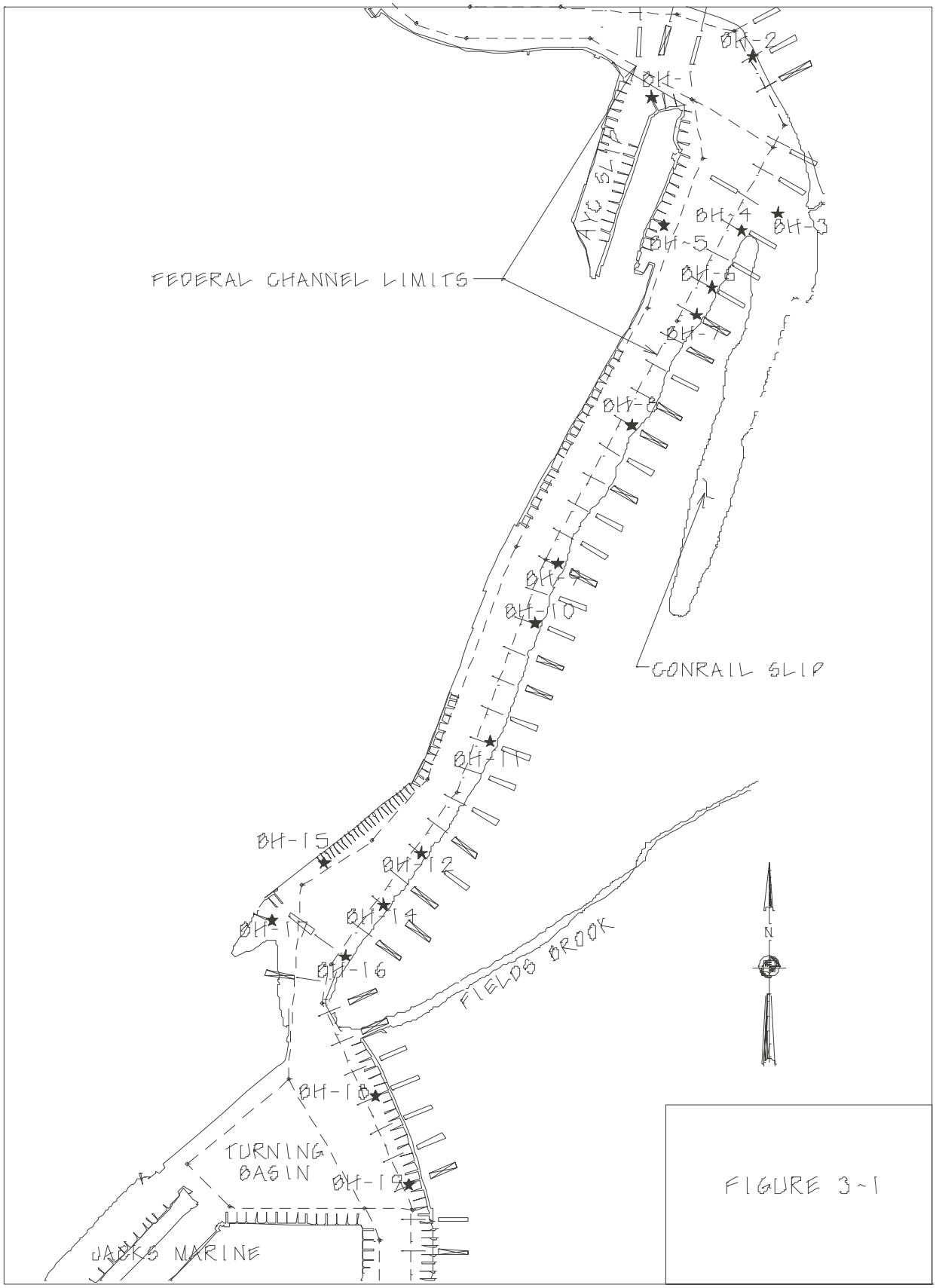

BH-1
BH-2
BH-3
BH-4
BH-5
BH-6
BH-7
BH-8
BH-9
BH-10
BH-11
BH-12
BH-13
BH-14
BH-15
BH-16
BH-17
BH-18
AYC SLIP
FEDERAL CHANNEL LIMITS
CONRAIL SLIP
FIELDS BROOK
TURNING BASIN
JACKS MARINE
N

FIGURE 3-1

The sample locations are shown on Figure 3-1. Sample cross-sections are provided in Appendix B.

3.2 Sample Collection

The Buffalo District, U.S. Army Corps of Engineers, was responsible for providing the personnel and equipment for obtaining sediment and river water samples from the Ashtabula River. Samples were collected in approved containers, transported to shore for documentation, storage, and transport to the laboratory. The actual sample collection procedures are explained in detail below.

The sediment samples were collected on 14 – 15 May 2003 by U.S. Environmental Protection Agency, Great Lakes National Program Office (USEPA-GLNPO) personnel aboard the USEPA research vessel (R/V) *Mudpuppy*. The *R/V Mudpuppy* captain attempted to position the vessel as close as possible to the coordinates given for each sample location using a GPS. However, there were instances where debris, shallow water depth, etc. prevented access to the proposed sample locations. In those cases, every attempt was made to locate the vessel as close to the proposed sample location as possible. Once positioned at the sample location, the vessel was secured with a triple anchoring system. The sample ID, actual coordinates, and water depth were recorded in the field sample log. Appendix C contains the field sampling notes. A summary of the data is provided in Table 3-1.

Sediment cores were collected utilizing new 10- and 15-foot, 4-inch diameter, polycarbonate core tubes. The sample collection procedure is as follows. The 4-inch core tubes are attached to the vibracore head and the entire assembly is raised to a vertical position over the vessel deck surface with a cable winch. The assembly is lowered until the core tube penetrates the sediment surface, where the vibrating head is activated. The assembly is lowered slowly, with the vibrating head running, until it ceases to penetrate the sediments. The vibrating head is turned off and the assembly is raised using the cable winch. The vibracore head is removed from the core tube, which is then capped and labeled prior to further processing. After the required number of sediment cores are collected at one location, the sampling vessel moves to the next sampling location to begin the procedure over again.

Once capped and labeled, the sediment core tubes were transferred from the *R/V Mudpuppy* to the Buffalo District pontoon boat. The penetration and recovery lengths for each core tube were recorded. If necessary, excess core tube was cut off using a handsaw, and the tube was re-capped. The core tubes were transported to shore and placed in refrigerated storage prior to shipment.

Due to size constraints of the refrigerated storage available at the laboratory, all core tubes longer than 11 feet were cut into two (2) sections consisting of the lower 6 feet of the core tube, and the remaining length. For example, a 14-foot core tube was separated into one 6-foot section from the bottom of the tube, and the remaining upper 8-foot section. The sections were cut, capped, labeled and transported to shore.

3.3 Laboratory Analyses

Based on telephone conference calls conducted on 2 & 5 May 2003 with members of the Ashtabula River Partnership, it was determined that the sediment samples would be screened and definitively analyzed for PCBs only. This was based, in part, on the fact that the baseline for both the CMP and EIS was the single decision criteria of 10 ppm PCBs, and that consideration of other parameters as decision criteria could have a significant impact on the project.

Upon arrival at the laboratory, the sediment cores were divided into 1-foot sections starting from the bottom of the core. After sectioning, a discrete sample was collected from each 1-foot section from the

Table 3-1
Core Summary

Core Site ID	Water Surface Above LWD	Water Depth	Sediment Surface Below LWD	Sediment Core Penetration	Bottom of Penetration Below LWD	Core Recovery
BH-1	1' 11"	4' 9"	2' 10"	14' 0"	16' 10"	13' 4"
BH-2	1' 11"	6' 6"	4' 7"	9' 0"	13' 7"	7' 10"
BH-3	1' 11"	6' 11"	5' 0"	9' 0 "	14' 0"	7' 6"
BH-4	1' 11"	9' 3"	7' 4"	7' 0"	14' 4"	7' 0"
BH-5	1' 11"	7' 11"	6' 0"	11' 0"	17' 0"	10' 9"
BH-6	1' 11"	5' 3"	3' 4"	5' 0"	8' 4"	4' 10"
BH-7	1' 11"	9' 5"	7' 6"	12' 0"	19' 6"	10' 7"
BH-8	1' 11"	not recorded		7' 0"		6' 10"
BH-9	1' 11"	12' 5"	10' 6"	13' 0"	23' 6"	10' 9"
BH-10	1' 11"	13' 2"	11' 3"	6' 0"	17' 3"	5' 3"
BH-11	1' 11"	5' 9"	3' 10"	13' 0"	16' 10"	12' 4"
BH-12	1' 11"	1' 11"	0' 0"	15' 0"	15' 0"	15' 0"
BH-13	1' 11"	9' 0""	NO SAMPLE			
BH-14	1' 11"	1' 7"	-0' 4"	15' 0"	14' 8"	14' 5"
BH-15	1' 11"	11' 0"	9' 1"	10' 0"	19' 1"	7' 10"
BH-16	1' 11"	1' 8"	-0' 3"	10' 0"	10' 3"	10' 0"
BH-17	1' 11"	7' 8"	5' 9"	5' 0"	10' 9"	4' 8"
BH-18	1' 11"	6' 3"	4' 4"	13' 0"	17' 4"	10' 2"
BH-19	1' 11"	6' 9"	4' 10"	14' 0"	18' 10"	12' 2"

bottom five feet of each sediment core and subjected to a PCB screening analysis. The results of the screening tests were provided to the Buffalo District Project Chemist for review. Based on the screening results, additional screening tests on the remaining core sections and/or definitive analysis of selected core section(s) were performed as directed by the Buffalo District. The detailed procedure and decision criteria established for this project is contained in Appendix D. Cross-sections are provided in Appendix B.

4.0 RESULTS

The field crew was unable to obtain sediment cores at location BH-13. Also, through a misunderstanding, the laboratory treated cut cores as separate core samples. Therefore, for the cores that were cut into two sections, PCB screening was performed by the laboratory on each of the cut sections.

The locations of the PCB analyses are related to a low water datum (LWD) used for dredging the river. Since the core recovery length was less than the core penetration depth, elevations in the individual recovered cores had to be extrapolated to get the depth relative to LWD.

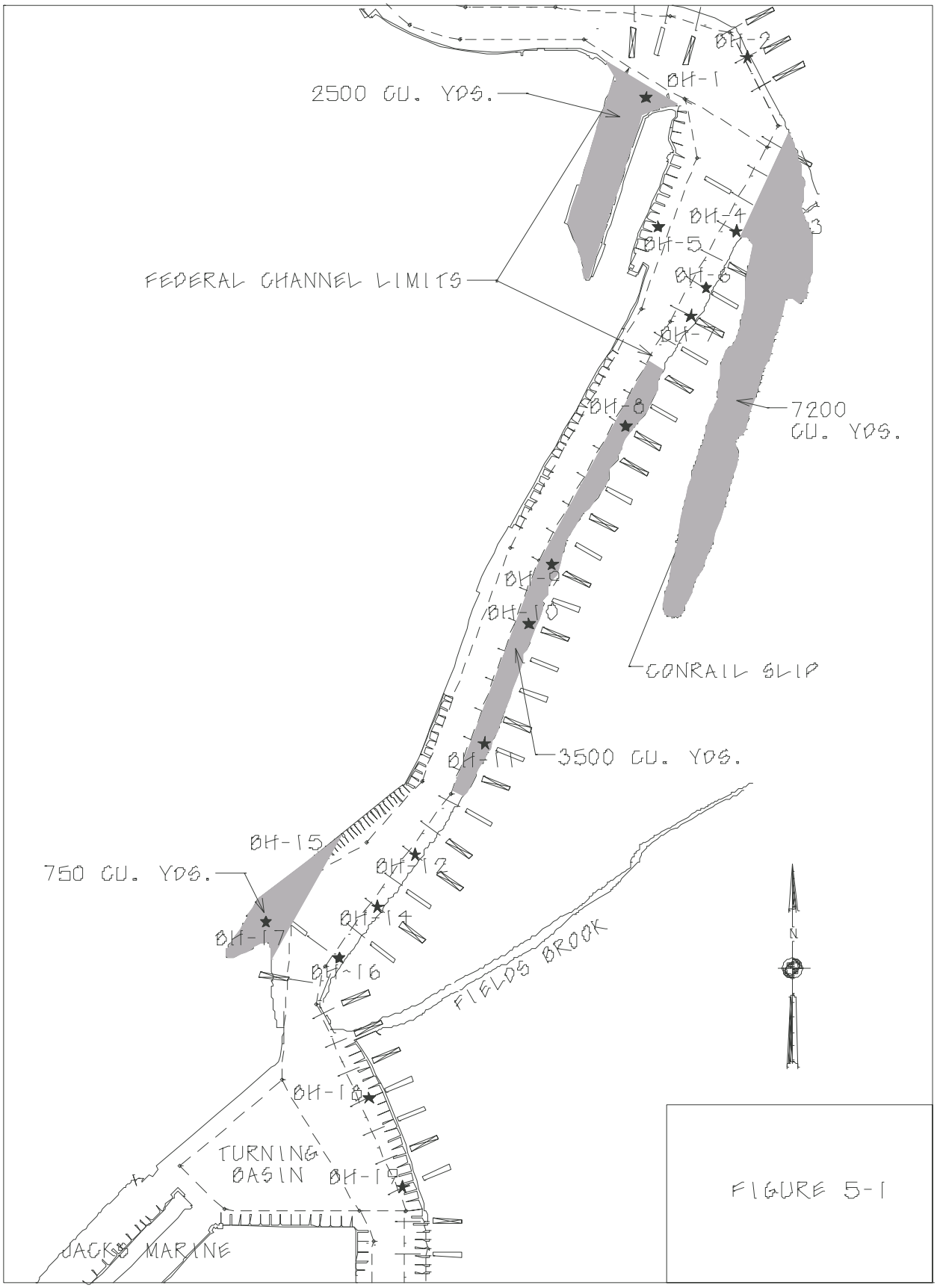
Summary tables of the results from the PCB screening tests and definitive analyses can be found in Appendix E. Coring diagrams showing pertinent information are provided in Appendix F. Actual laboratory reports are provided in Appendix G.

5.0 CONCLUSIONS

Best engineering and environmental judgment was made to delineate the areas that could be left in place.

The areas identified where sediment could remain in place are delineated in Figure 5-1. Sediment volumes were obtained from the 3-dimensional model containing the sounding elevations.

The locations and volumes of sediment that can be left in place are: the Ashtabula Yacht Club Slip (2500 yd^3), the Slip 5A area (7200 yd^3), and the marsh area at the end of Kister Marine (750 yd^3), all of which were calculated. The area downstream of Fields Brook on the east bank of the Ashtabula River (3500 yd^3) was approximated from numbers for two other areas along the bank.


BH-2
BH-1
2500 CU. YDS.
BH-4
BH-5
FEDERAL CHANNEL LIMITS
BH-6
BH-7
BH-8
7200
CU. YDS.
BH-9
BH-10
CONRAIL SLIP
BH-11
3500 CU. YDS.
BH-15
750 CU. YDS.
BH-12
BH-14
BH-17
BH-16
FIELDS BROOK
N
BH-18
TURNING
BASIN BH-19
JACKS MARINE
FIGURE 5-1

References

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